

REMARKS

Favorable reconsideration of this application, as presently amended and in light of the following discussion, is respectfully requested.

Claims 1-25 are currently pending. Claims 1, 8, 19, and 23-25 have been amended by the present amendment. The changes to the claims are supported by the originally filed specification and do not add new matter.

In the outstanding Office Action, Claim 25 was rejected under 35 U.S.C. § 101 as being directed to non-statutory subject matter; Claims 1 and 5 were rejected under 35 U.S.C. § 103(a) as being unpatentable over U.S. Patent Application Publication No. 2003/0137701 to Shimizu (hereinafter “the ‘701 application”) in view of U.S. Patent No. 6,278,526 to Kurozasa (hereinafter “the ‘526 patent”); Claims 2, 4, and 7 were rejected under 35 U.S.C. § 103(a) as being unpatentable over the ‘701 application and the ‘526 patent, further in view of U.S. Patent No. 6,278,513 to Murata et al. (hereinafter “the ‘513 patent”); Claim 3 was rejected under 35 U.S.C. § 103(a) as being unpatentable over the ‘701 application and the ‘526 patent, further in view of U.S. Patent No. 7,312,898 to Feng et al. (hereinafter “the ‘898 patent”); Claims 8, 10, 11, and 15 were rejected under 35 U.S.C. § 103(a) as being unpatentable over the ‘701 application and the ‘526 patent, further in view of the ‘513 patent and U.S. Patent No. 5,727,083 to Kelly et al. (hereinafter “the ‘083 patent”); Claims 6, 9, 12-14, and 16-18 were rejected under 35 U.S.C. § 103(a) as being unpatentable over the ‘701 application and the ‘526 patent, further in view of U.S. Patent No. 5,528,740 to Hill et al. (hereinafter “the ‘740 patent”) in view of the ‘083 patent, further in view of European Patent Application EP 0926622 to Nishij et al. (hereinafter “the ‘622 patent”); Claims 19 and 20 were rejected under 35 U.S.C. § 103(a) as being unpatentable over the ‘701 application in view of the ‘513 patent; Claim 21 was rejected under 35 U.S.C. § 103(a) as being unpatentable over the ‘701 application and the ‘513 patent, further in view of the ‘898 patent;

Claim 22 was rejected under 35 U.S.C. § 103(a) as being unpatentable over the '701 application in view of the '083 patent; and Claims 23-25 were rejected under 35 U.S.C. § 103(a) as being unpatentable over the '701 application and the '083 patent, further in view of the '622 patent.

Applicants respectfully submit that the rejection of Claim 25 is rendered moot by the present amendment to that claim. Claim 25 has been amended to be directed to a computer readable medium, as suggested in the outstanding Office Action. Accordingly, the rejection is believed to have been rendered moot.

Amended Claim 1 is directed to an image reproduction apparatus including an image copying function for reproducing input image data including image data obtained by reading a document, and for outputting the reproduced image data, the image reproduction apparatus comprising, *inter alia*, (1) extension control means to which a controller board is connectable to add one or more optional units to realize one or more extension functions, the extension control means allowing operation control in the one or more extension functions to be performed in a same manner as in the image copying function, and allowing image data to be input/output in the extension functions in a same format as in the image copying function, the controller board including a system controller and an arbiter that arbitrates use of resources shared by the one or more extension functions; (2) image quality retaining means for retaining a quality of an image reproduced via the extension control means at a level similar to that of an image produced by the image copying function; and (3) operation control means for controlling operation of the image reproduction apparatus in a similar manner, regardless of whether the operation is associated with the image copying function or the one or more extension functions provided by the extension control means. The changes to Claim 1 are supported by the originally filed specification and do not add new matter.¹

¹ See, e.g., page 16 and Figure 1A.

Applicants respectfully submit that the rejection of Claim 1 is rendered moot by the present amendment to that claim.

Regarding the rejection of Claim 1 under 35 U.S.C. § 103(a), the Office Action asserts that the '701 application discloses everything in Claim 1, with the exception of the image quality obtaining means, and relies on the '526 patent to remedy that deficiency.

The '701 application is directed to an image processing apparatus that includes a main controller 33, an I/O controller 51, and a network controller 42. As shown in Figure 3, the '701 application discloses a scanner interface 46 connected to a connector 56 as well as a printer interface 48 connected to a connector 59. In addition, the '701 application discloses an extended connector 50 that can be connected to other devices. However, as admitted in the outstanding Office Action, the '701 application fails to disclose the image quality retaining means recited in Claim 1. Further, Applicants respectfully submit that the '701 application fails to disclose extension control means to which a controller board is connectable, wherein the controller board includes a system controller and an arbiter that arbitrates use of resources shared by the one or more extension functions, as recited in amended Claim 1. The '701 application is silent regarding the controller board having an arbiter, as recited in amended Claim 1. The '701 application discloses an extended connector 50, which is merely a connector.

The '526 patent is directed to an external computer that is connected to a main control unit of a copy machine via a control unit. In particular, the '526 patent discloses that the control unit reads programs from the ROM of the control unit for translating commands sent from the external computer and transmits the transmitted commands to the main control unit to perform a designated copy mode. Thus, the '526 patent discloses that the control unit itself performs data processing that cannot be performed by the main control unit so that various copy modes are available. However, Applicants respectfully submit that the '526 patent fails

to disclose extension control means to which a controller board is connectable, wherein the controller board includes a system controller and an arbiter that arbitrates use of resources shared by the one or more extension functions, as recited in amended Claim 1. In this regard, Applicants note that the control unit 200 disclosed by the '526 patent is external to the image processing device and does not include the claimed arbiter. Further, the '526 patent is silent regarding the arbiter recited in amended Claim 1.

Thus, no matter how the teachings of the '701 application and the '526 patent are combined, the combination does not teach or suggest an extension control means to which a controller board is connectable, wherein the controller board includes a system controller and an arbiter that arbitrates use of resources shared by the one or more extension functions, as recited in amended Claim 1. Accordingly, Applicants respectfully submit that the rejection of Claim 1 (and all similarly rejected dependent claims) is rendered moot by the present amendment to Claim 1.

Amended Claim 8 is directed to an image reproduction apparatus including an image copying function for reproducing input image data including image data obtained by reading a document and outputting the reproduced image data, the image reproduction apparatus comprising, *inter alia*, (1) line decimation control means for converting resolution of the image data; (2) pixel loss compensation means for compensating for a loss of pixel information caused by line decimation; (3) invalid pixel detection means for detecting an invalid pixel that causes a streak image in an image read using a sheet-through document feeder, prior to reading the image using the sheet-through document feeder; (4) streak image correction means for correcting the streak image; and (5) warning means for warning of an occurrence of the invalid pixel. The changes to Claim 8 are supported by the originally filed specification and do not add new matter.²

² See page 41, lines 24-28.

Applicants respectfully submit that the rejection of Claim 8 is rendered moot by the present amendment to Claim 8.

Regarding the rejection of Claim 8 under 35 U.S.C. § 103(a), the Office Action asserts that the '701 application and the '526 patent disclose everything in Claim 8 with the exception of line decimation control means, pixel loss compensation means, invalid pixel detection means, streak image correction means, and warning means for warning of an occurrence of an invalid pixel, and relies on the '513 patent and the '083 patent to remedy those deficiencies.

As discussed above, the '701 application and the '526 patent are directed to image processing devices. However, as admitted in the outstanding Office Action, the '701 application and the '526 patent fail to disclose the invalid pixel detection means for detecting an invalid pixel that causes a streak image in an image read using a sheet-through document feeder, as recited in Claim 8. Further, Applicants further submit that the '701 application and the '526 patent fail to disclose invalid pixel detection means for detecting an invalid pixel that causes a streak image in an image read using a sheet-through document feeder, prior to reading the image using the sheet-through document feeder, as recited in amended Claim 1.

The '513 patent is directed to an image reader that includes means for electrically scanning lines of image information of a document in a primary scanning direction; scanning means for mechanically moving a primary scanning position with respect to the document at a constant secondary scanning speed V in a secondary scanning direction perpendicular to the primary scanning direction; and line thinning means for thinning out lines of the image signal. The '513 patent also discloses a document feeder. However, as admitted in the outstanding Office Action, the '513 patent fails to disclose the invalid pixel detection means, the streak image correction means, and the warning means recited in amended Claim 8.

The '083 patent is directed to a method for improving the image quality of a facsimile transmission by recovering data corrupted by channel impairments without retransmission. As shown in Figure 1, the '083 patent discloses a facsimile transmission modem that includes a source coder 102, a randomizer 104, a differential coder 106, and a modulator 108. The '083 patent discloses that the output of the modulator 108 is transmitted over a telephone line to a facsimile reception modem 200. Further, the '083 patent discloses that the facsimile reception modem 200 includes a channel equalizer 202, a symbol decision circuit 204, a differential decoder 206, a derandomizer 208, and a source decoder 210. Further, the '083 patent discloses that, due to channel impairments such as noise, frequency offset, phase jitter, intermodulation distortion, interference, and attenuation, the facsimile reception modem may make errors in determining the decoded symbols. Further, the '083 patent discloses that based on the facsimile modem characteristics, various correction techniques can be used when errors are detected in a line of an image being transmitted. See the flowcharts in Figures 5, 6, 7, and 10.

However, Applicants respectfully submit that the '083 patent fails to disclose invalid pixel detection means for detecting an invalid pixel that causes a streak image in an image read using a sheet-through document feeder, prior to reading the image using the sheet-through document feeder, as recited in amended Claim 8. Rather, the '083 patent discloses detecting errors in a facsimile transmission after the facsimile transmission is received. The '083 patent is silent regarding detecting invalid pixels prior to reading an image using a sheet-through document feeder, as recited in Claim 8. The '083 patent is silent regarding a sheet-through document feeder, and is silent regarding detecting invalid pixels prior to reading an image, as required by Claim 8. In this regard, in a non-limiting example, Applicants note that the invalid pixel detection means reads a background plate of the sheet-through document feeder and detects sizes of invalid pixels, which may be caused due to dust

in the sheet-through document feeder. Further, while Applicants note that the '513 patent discloses a document feeder, it is silent regarding invalid pixels that can cause a streak image in the image read using the document feeder.

Thus, no matter how the teachings of the '710 application, the '526 patent, the '513 patent, and the '083 patent are combined, the combination does not teach or suggest invalid pixel detection means for detecting an invalid pixel that causes a streak image in an image read using a sheet-through document feeder, prior to reading the image using the sheet-through document feeder, as recited in Claim 8. Even if the sheet-through document feeder disclosed by the '513 patent is combined with the error detection process disclosed by the '083 patent, the combination does not result in means for detecting an invalid pixel prior to reading an image using the sheet-through document feeder, as required by Claim 8. Since the invalid pixel detection means recited in Claim 8 is performed prior to reading the image using the sheet-through document feeder, the invalid pixel detection means is not based on read image data. In contrast, the process disclosed by the '083 patent relies on an examination of actual decoded facsimile data to detect errors.

Independent Claim 19 has been amended to include a step of detecting an invalid pixel that causes a streak image in an image read using a sheet-through document feeder, prior to reading the image using the sheet-through document feeder. As discussed above, the combined teachings of the '701 application and the '513 patent fail to disclose this limitation. Further, the '083 patent fails to remedy the deficiencies of the '701 application and the '513 patent. Accordingly, Applicants respectfully submit that the rejection of Claim 19 is rendered moot by the present amendment to that claim.

Independent Claim 22 is directed to an image reproduction method comprising the steps of: (1) reading an image; (2) detecting an invalid pixel from the image read in the reading step; (3) detecting a maximum width of invalid pixels detected in the step of

detecting the invalid pixel; (4) detecting a number of invalid pixels detected in the step of detecting the invalid pixel; (5) detecting allocation, on a document, of each invalid pixel detected in the step of detecting the invalid pixel; (6) predicting an occurrence of a streak image in a document image from results of detection made in the step of detecting the maximum width, the step of detecting the number of invalid pixels, and the step of detecting the location of each invalid pixel; and (7) correcting the streak image in the document image based on a result of the prediction made in the predicting step.

Regarding the rejection of Claim 22 under 35 U.S.C. § 103, the Office Action asserts that the '701 application discloses everything in Claim 22 with the exception of detecting an invalid pixel, detecting a maximum width of invalid pixels, detecting a number of invalid pixels, detecting allocation of each invalid pixel, predicting occurrence of a streak image, and correcting the streak image, and relies on the '083 patent to remedy that deficiency.

As discussed above, the '083 patent is directed to a method for improving the image quality of facsimile transmissions by detecting errors in an image line, and attempting to correct the image based upon knowledge of the transmission standard.

However, Applicants respectfully submit that the '083 patent fails to disclose detecting a maximum width of invalid pixels detected in the step of detecting the invalid pixel; and detecting a number of invalid pixels detected in the step of detecting the invalid pixel, as recited in Claim 22. In this regard, Applicants note that the Office Action cites to column 4, lines 29-34 in the '083 patent as disclosing these limitations. However, in column 4 the '083 patent merely discloses that "demodulation errors will introduce multiple bit errors. Symbol decision errors generate bit errors in specific patterns. Furthermore, n bit errors will span more than n bits due to the operation of derandomizer 208."³ However, Applicants respectfully submit that this is not a disclosure of detecting a maximum width of

³ '083 patent, column 4, lines 33-36.

invalid pixels, or detecting a number of invalid pixels. In this regard, Applicants note that Claim 22 also requires predicting an occurrence of a streak image based on results of detecting the maximum width and detecting the number of invalid pixels. The '083 patent is silent regarding a streak image, and is silent regarding basing the occurrence of a streak image on a maximum width of invalid pixels. The passage in column 4 cited by the Office Action does not say anything about the detection of a maximum width of invalid pixels.

Thus, no matter how the teachings of the '701 application the '083 patent are combined, the combination does not teach or suggest the steps of detecting a maximum width, detecting a number of invalid pixels, and predicting an occurrence of a streak image from results of detection made in the step of detecting the maximum width and the step of detecting the number of invalid pixels, as recited in Claim 22. Accordingly, Applicants respectfully submit that a *prima facie* case of obviousness has not been established and the rejection of Claim 22 should be withdrawn.

Claim 23 is directed to an image reproduction method, comprising: (1) reading an image; (2) dividing the image into blocks with a predetermined block size; (3) detecting a total number of invalid pixels and a number of invalid pixels at successive locations in each block produced in the dividing step; and (4) detecting a blank document page by calculating a sum of the numbers detected for respective blocks in the step of detecting the total number of invalid pixels.

However, Applicants respectfully submit that the combined teachings of the '701 application and the '083 patent fail to disclose detecting a total number of invalid pixels and a number of invalid pixels at successive locations in each block produced in the dividing step. Further, Applicants respectfully submit that the combined teachings of the '701 application and the '083 patent fail to disclose detecting a blank page by calculating a sum of the numbers detected for respective blocks in the step of detecting the total number of invalid

pixels, as recited in Claim 23. In this regard, Applicants note that page 22 of the outstanding Office Action asserts that the '083 patent discloses detecting a total number of invalid pixels and a number of invalid pixels at successive locations in column 1, lines 39-43 of the '083 patent. However, Applicants note that this passage states that "an optional feature of facsimile is an error correction mode (ECM) where the transmitter segments an image into packets and appends a cyclic redundancy check (CRC) sum. The receiver is expected to use the CRC value to detect errors, and, if necessary, request retransmission of data."⁴ Thus, the '083 patent discloses the use of CRC values for error correction. However, Applicants respectfully submit that this is not a disclosure of detecting a total number of invalid pixels and a number of invalid pixels at successive locations in each block produced in the dividing step, as recited in Claim 23. CRC values are determined at the transmitter, and invalid pixels are not detected at a transmitter. Thus, the '083 patent merely discloses the use of a well-known CRC check sum, but not detecting a total number of invalid pixels or a number of invalid pixels at successive locations in each block.

The '622 patent is directed to an image forming apparatus that has a normal print mode in which input image data for a plurality of pages are processed into images on the same number of pages of paper. Further, the '622 patent discloses a blank mode detector for detecting a blank page with no image data from the input image data. However, Applicants respectfully submit that the '622 patent fails to disclose detecting a blank document page by calculating a sum of the numbers detected for respective blocks and the step of detecting the total number of invalid pixels, as recited in Claim 23. Applicants respectfully submit the '622 patent is silent regarding calculating a sum of the numbers detected for respective blocks and the step of detecting the total number of invalid pixels, as required by Claim 23.

⁴ '083 patent, column 1, lines 39-43.

Thus, no matter how the teachings of the '701 application, the '083 patent, and the '622 patent are combined, the combination does not teach or suggest the detecting steps recited in Claim 23. Accordingly, Applicants respectfully submit that a *prima facie* case of obviousness has not been established and the rejection of Claim 23 should be withdrawn.

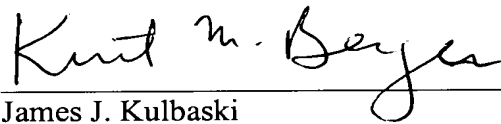
Claim 24 recites limitations analogous to those recited in Claim 23. In particular, Claim 24 recites the steps of detecting a total number of invalid pixels and a number of invalid pixels at successive locations in each block produced in the dividing step, as well as determining whether a document page is blank by determining a streak image which is predicted to occur, as well as subtracting a streak image component caused by successively located invalid pixels from the document image data, thereby predicting a real state of the document. Applicants respectfully submit that the combined teachings of the '701 application, the '083 patent, and the '622 patent are silent regarding these limitations. Accordingly, Applicants respectfully submit that a *prima facie* case of obviousness has not been established and that the rejection of Claim 24 should be withdrawn.

Thus, it is respectfully submitted that independent Claims 1, 8, 19, 22, 23, and 24 (and all associated dependent claims) patentably define over any proper combination of the cited references.

Consequently, in view of the present amendment and in light of the above discussion, the outstanding grounds for rejection are believed to have been overcome. The application as amended herewith is believed to be in condition for formal allowance. An early and favorable action to that effect is respectfully requested.

Respectfully submitted,

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A handwritten signature in black ink, appearing to read "Kurt M. Berger", is written over a horizontal line.

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